國立臺灣海洋大學100學年度轉學生入學招生考試試題

考試科目： 工程數學　　*可使用計算機

系所名稱： 日通訊三

1.答案以橫式由左至右書寫。2.請依題號順序作答。

1. Find the general solutions of the second-order differential equations

(a) $y'' + 2y' - 3y = 4e^{2x}$ (15%)

(b) $x^2y'' - 3xy' + 4y = 0$， $y(1) = 4$， $y'(1) = 5$ (15%)

2. Solve the integral equation of the form (15%)

$$y(t) = \cos(t) + e^{-2t}\int_0^t y(\alpha)e^{2\alpha}d\alpha$$

3. Find the inverse Laplace transform of the function $\frac{3s+7}{s^2-2s-3}$. (10%)

4. Evaluate the line integral $\oint_C F \bullet dR$, where $F = 2yi - xj$ and C is the circle of radius 4 about (1,3). (10%)

5. Evaluate the following integral over the given path.

$\oint_\Gamma \frac{3z+1}{z^3-z}dz$; Γ is the circle of radius $\frac{1}{2}$ about 0. (15%)

6. Evaluate the integral $\int_{-\infty}^{\infty} \frac{1}{x(x+4)(x^2+16)}dx$. (20%)